Federal Executive Board

Common Lean Six Sigma Abbreviations

Abbreviation		Abbreviation	
BVA	Business Value Added	PDSA	Plan-Do-Study-Act
CBR	Critical Business Requirement	RPIE	Rapid Process Improvement Event
CCR	Critical Customer Requirement	RPIW	Rapid Process Improvement Workshop
CI	Continuous Improvement	SIPOC	Supplier-Input-Process-Output-Customer
COPQ	Cost of Poor Quality	SQL	Six Sigma Quality Level
DPMO	Defects per Million Opportunities	StDeve	Standard Deviation
JDI	Just Do It	TPOC	Transformational Plan of Care
JSI	Just Stop It	VA	Value Added
KPIV	Key Process Input Variable	VOB	Voice of Business
KPOV	Key Process Output Variable	VOC	Voice of Customer
NVA	Non Value Added	VSA	Value Stream Analysis

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ICE BREAKER

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House Keeping Items

- Restrooms
- Silence all cell phones, pagers, etc.
- Questions
- Breaks
- Schedule
- Lean Six Sigma Pocket Tool Box

Course Objectives

- Develop an understanding of Lean and Six Sigma methodologies.
- Utilize basic Lean and Six Sigma tools to define improvement opportunities.
- Apply lean techniques to improve processes.
- Understand the tools needed to implement small projects in your work area.

Expectations

1. Participate
2. Get out of your comfort zone – Think outside of the box.
3. Acknowledge Change
4. Be prepared and on time
5. Have Fun

Section 1: Introduction to Lean Six Sigma




History of Lean

1913
Henry Ford invents the Assembly Line

1950
Eiji Toyoda visits Ford Plan & returns to Japan & develops the Toyota Production System

14 Principles of the Toyota Way

1. Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals
2. Create a continuous process flow to bring problems to the surface
3. Use "pull" systems to avoid overproduction
4. Level out the workload (work like the tortoise, not the hare)
5. Build a culture of stopping to fix problems, to get quality right the first time
6. Standardized tasks and processes are the foundation for continuous improvement and employee empowerment
7. Use visual controls so no problems are hidden
8. Use only reliable, thoroughly tested technology that serves your people & process
9. Grow leaders who thoroughly understand the work, live the philosophy, & teach it to others
10. Develop exceptional people & teams who follow your company's philosophy
11. Respect your extended network of partners & suppliers by challenging them & helping them improve
12. Go & see for yourself to thoroughly understand the situation
13. Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly
14. Become a learning organization through relentless reflection & continuous improvement

History of Six Sigma

1924 - Walter Shewhart invented the Control Chart to monitor process consistency

Deming, Juran, & others developed methodologies such as PDSA cycle & Total Quality Management approaches to quality management

1980 – Bill Smith a Motorola engineer introduced the concept of Six Sigma to standardize defect measurement

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What is Lean Six Sigma?

- A statistical measurement
- A goal
- A measure of quality
- A methodology
- A management philosophy focused on customer satisfaction
- A strategy for organization transformation

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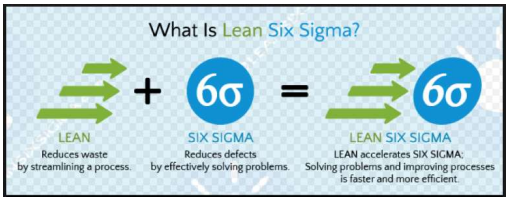
Lean and Six Sigma are Synergistic



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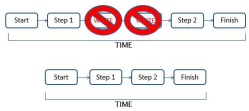
Lean = Removing Waste

- Remove waste from the system
  - Things that do not need to be done or consumed
- Does something **add value** to the customer?
  - Waste is any activity that absorbs resources & creates **NO** value for the customer



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Add Value and Reduce Waste

- Value Added (VA) Activities:
  - Any part of the process the improves the product/action for the customer
  - Any activity that changes the work to meet customer requirements or a specific request they are willing to buy
- Non-Value Activities (WASTE)
  - Any activities that consumes a resource, but does not add value for the customer
    - Steps that we can identify and eliminate = **Non-Value Added and unnecessary** (NVA)
    - Steps that we recognize as non-value added, but under current conditions we cannot eliminate it due to a policy or directive = **Non-Value Added, but Necessary** (BVA)

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Example Of Value and Non-Value

Value Added Activities Voice of the Customer	Non-Value Added Activities	Non-Value Added Activities, But Necessary
• No delays in access to products, services, or care – no scheduled waiting • Accurate, consistent, satisfying outcomes • Service flexibility • No delays in receiving test results, medication, products, services, benefits, or care	• Patient waiting in an exam room for a provider • An employee's time spent looking for equipment or supplies • Non standard processes • Time spent making extra copies "just in case	• Checking a patient's identification with every encounter • Triaging patients in the ED • Patients signing HIPPA forms • Employees completing 20+ year history forms to apply for a position

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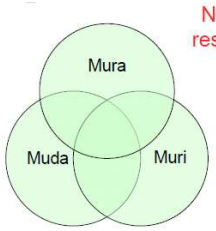
Examples of Waste



Non-value adding, resource consuming activities

- Mura – unbalanced workflow
- Muri – overburdening people or equipment
- Muda – process steps that do not add value

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Mura – Unevenness

- Needs and demands have natural variation which we often make worse
  - No standardization
  - Handoffs
  - Delaying
  - Lack of skills and training to complete a task

2nd order improvements result from reducing variation

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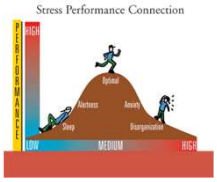
Muri - Overburden

- Occurs when the human element of a work process is not:
  - Safe
  - Stress free
  - Engaging at some level
- Causes stem from:
  - Too much waste
  - Too much to do and not enough time
  - Poor ergonomics



Tolerating Overburden demonstrates a lack of respect for people

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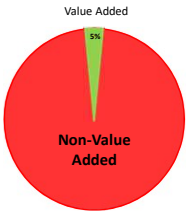
Non-Value Added Steps - Muda

- Typically 95% of Healthcare process time is non-value added
- Eight Forms of Waste: DOWNTIME

1. Defects
2. Overproduction
3. Waiting
4. Not utilizing human potential
5. Transportation
6. Inventory
7. Motion
8. Extra processing



1st order improvements result from eliminating waste

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Defects

- Definition: Mistakes that require additional time, resources, or money to fix
- Examples:
  - Incorrect Patient Information
  - Chart Errors
  - Surgical Errors
  - Illegible Hand Writing
  - Incorrect Billing Addresses

Medication and Medical Errors

Percent in the past two years:	AUS	CAN	NZ	UK	US
Given the wrong medication or wrong dose by a doctor, hospital, or pharmacist	11	11	13	10	12
Believed a medical mistake was made in your treatment or care	19*	20	18*	13*	23
Either error: medication error or medical mistake	23*	25	23*	18*	28

* Significantly different than U.S. at p<.05.
The Commonwealth Fund 2002 International Health Policy Survey — Adults with health problems

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Overproduction

- Definition:
  - Redundancy
  - Producing more than necessary
- Examples:
  - Making copies of a form never used
  - Requiring documents signed in triplicate
  - Cc'ing email unnecessarily

Overproduction is the worst waste, leading to all other wastes

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Waiting

- Definition: Idle time of people, products, or processes
- Examples:
  - Inpatient waiting to be discharged
  - Patient waiting for physician
  - Waiting for surgery
  - Meeting doesn't start on time
  - Vendors out of stock

Any time there is a WAIT, there is a WASTE

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Not Using Human Potential (Intellect)

- Definition: The failure to fully utilize the time & talents of people in their work to create value
- Examples:
  - Uneven workload
  - Not working at top of scope
    - Ex: Surgeon cleaning instruments
  - Lack of job training
    - Ex: Inserting an IV without training
  - Wrong person doing the job/task

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Transportation

- Definition: Requires relocation/delivery of patient, materials, equipment, or supplies to complete a task
  - You are moving **something**

- Examples:
  - Delivery of medications
  - Transporting patients
  - Moving equipment
  - Shipment of products using slowest routes

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Inventory

- Definition:
  - Materials or supplies that are purchased or stocked, but not immediately sold or used
- Examples:
  - Expired products
  - Hoarding materials
  - Overstocking supply rooms
  - Unnecessary instruments contained in an operating set

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Motion

- Definition:
  - **YOU** are the something moving
- Examples:
  - Looking for meds, charts, equipment
  - Searching for patients & supplies
  - Bending/Reaching unnecessarily

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Extra Processing

- Definition:
  - Tasks, activities, or materials that are not valued by the customer, or align with the customer needs
  - Can be caused by poor product or service design, or not understanding what the customer truly wants
- Examples:
  - Hand-outs that contain more information than the patient needs or wants
  - Multiple signature requirements

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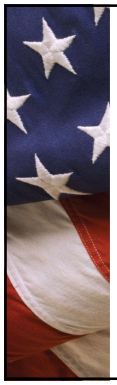

Lean is NOT

- Less space
- Fewer staff
- Limited resources
- Efficiency no matter what
- Not enough supplies
- Giving the customer the bare minimum

Lean is: maximizing customer value while eliminating waste

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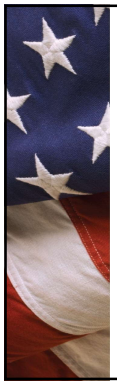
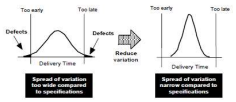


Why Six Sigma

To INCREASE process performance, you have to DECREASE variation



Less variation provides:

- Greater predictability in the process
- Less waste and rework, which lowers costs
- Products and services that perform better and last longer
- Happier customers

Every Human Activity has Variability

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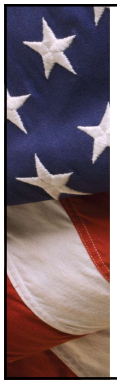

Six Sigma

- If a process has Six Sigma quality this means that the process has less than 3.4 defects per million opportunities.

Z_{ST}	DPMO	Remarks
6	3.4	World-class
5	233	Significantly above average
4.2	3470	Above industry average
4	6210	Industry average
3	66800	Industry average
2	308500	Below industry average
1	691500	Not competitive

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Examples of Six Sigma Quality

Sigma	Spelling	Money	Time	DPMO
3 σ	1.5 misspelled words per page in a book	$ 2.7 Million Indebtedness per $1 Billion in Assets	3 ½ Months per century	66,807
4 σ	1 misspelled word per 30 pages in a book	$63,000 Indebtedness per $1 Billion in Assets	2 ½ Days per century	6,210
5 σ	1 misspelled word in a set of encyclopedias	$ 570 Indebtedness per $1 Billion in Assets	30 Minutes Per Century	233
6 σ	1 misspelled word in all the books in a small library	$ 2 Indebtedness per $1 Billion in Assets	6 Seconds Per Century	3.4

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Basic Statistics

- Statistics is a mathematical science pertaining to the collection, analysis, interpretation or explanation, and presentation of data
  - **Descriptive statistics:** methods used to summarize or describe a collection of data
  - **Inferential statistics:** methods used to draw inferences about the process or population being studied.

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Descriptive Statistics in Layman Terms

- Descriptive data is used everyday in more ways than you probably realize.
- If you have ever said, "average", "percentage", or "figure the odds", you have used descriptive statistics.

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Inferential Statistics in Layman Terms

- You don't have to eat the whole pie to see if the recipe is any good.
- You can test a sample to make a decision about the population.

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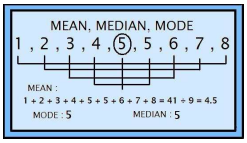
Measures of Central Tendency

- Mean
  - Simple average of a set of values
  - Reflects the influence of the all values
  - Strongly influenced by extreme values
- Median
  - The value in the middle of the data set after all of the numbers have been sorted from the lowest to the highest value
- Mode
  - The value that occurs most frequently in a data set



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Measure of Dispersion

- Range
  - The distance between the most extreme values of a data set (Highest value – Lowest value)
  - Sensitive to outliers
  - Magnitude tends to increase with sample size
- Variance
  - A sort of average of the squared deviations of all points from the mean
- Standard deviation
  - The square root of the variance
  - Used to provide measure of variability in original units of data set

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Types of Variation

- Common Causes (Noise)
  - **Normal changes within a process** that leads to slight difference in the output results.
  - Usually occurs very frequently
  - Can be removed and/or minimized, but requires a fundamental change in the process.

Example: You estimate 20 minutes to get ready and ten minutes to get to work. Instead, you take five minutes extra getting ready because you had to pack a lunch and 15 additional minutes to get to work because of traffic.

Other Examples: : Lack of clearly defined standard procedures; poor working conditions; measurement errors; normal wear and tear; computer response times

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Types of Variation

- Special Causes (Signals)
  - Also called "**assignable causes**"
  - Factors within a process that cause significant difference in the output results
  - Usually occurs infrequently
  - Can be removed/minimized by basic process control and monitoring

Examples: You are driving to work, and you estimate arrival in 10 minutes every day. One day, it took you 20 minutes to arrive at work because you were caught in traffic from an accident zone and were held up.

Other Examples: A machine malfunctions; a computer crashes; there is a power outage

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Recap: Introduction to Lean Six Sigma

- Lean Six Sigma combines two powerful continuous improvement methodologies.
- Six Sigma focuses on problem solving and reducing defects and variation I processes.
- Lean focuses on reducing waste and streamlining processes.

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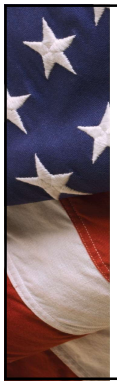
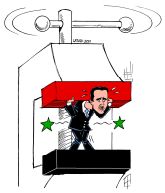


Department Of Permitting (DOP)

MN Department of Permitting provides permits for commercial vehicle parking. In recent election, the newly elected Governor promised to *clean-up* the DOP after hearing several complaints on length of time it takes to receive permits and that several constituents reported having vehicles towed due to improper permits. On day one of taking office, the Governor contacts the Director of Permits and gives the director 30 days to correct the permitting process.



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